What have new efforts to change professional practice achieved?

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J R Soc Med 1998;**91**(Suppl. 35):20–25 FORUM ON QUALITY IN HEALTHCARE, 15 APRIL 1997

INTRODUCTION

Despite the considerable resources devoted to biomedical science, a consistent finding from the literature is that the transfer of research findings into practice is a slow and haphazard process. For example, in 1988 the results of the ISIS-2 trial were published. It provided (perhaps) the most robust evidence available on the effectiveness of a health care intervention (thrombolysis in acute myocardial infarction). However, a series of international studies in the 1990s observed that many eligible patients failed to receive thrombolysis. The European Secondary Prevention Study Group[1] observed that the eligible proportion of patients receiving thrombolysis in 11 European countries varied between 13% and 52% with a median of 36%. McLaughlin and colleagues[2] observed that only 72% of eligible patients received thrombolysis in North American settings, with less compliance for elderly patients. The McLaughlin study[2] also observed that 20% of ineligible patients received lidocaine despite its potential harmful effects[3].

For many years, the traditional approach to dissemination has been the publication of research findings in journals (or other media) which the target audience is likely to read in the belief that this will lead to changes in practice (Figure 1). The recognition of the failure of this model has led to greater awareness of the role of other factors in the practice environment influencing behaviour[4] and the importance of identifying potential barriers to changing practice when planning implementation activities[5]. However, relatively little attention has been given to issues relating to implementing evidence-based healthcare (EBC)[6] and many discussions on implementation reflect beliefs of the stakeholders rather than evidence of effectiveness of different strategies[7]. We discuss the current evidence on the effectiveness of different strategies in order to promote 'evidence-based implementation' alongside evidence-based medicine[7].

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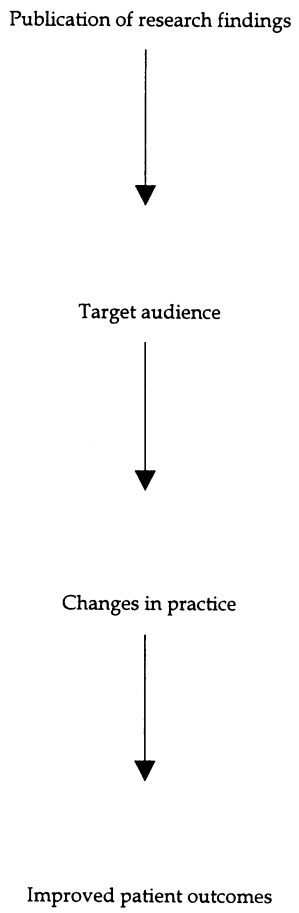

Figure 1 **Traditional model of dissemination**

COCHRANE EFFECTIVE PRACTICE AND ORGANIZATION OF CARE (EPOC) GROUP

The Cochrane Collaboration is an international enterprise which aims 'to help people make well-informed decisions about health by preparing, maintaining and ensuring the accessibility of systematic reviews of the benefits and risks of healthcare interventions'[8]. The Cochrane Collaboration is a decentralized organization whose main constituents are review groups which aim to undertake systematic reviews in a defined (usually clinical) area[9]. Systematic reviews and protocols for reviews are published in the Cochrane Database of Systematic Reviews, one component of the Cochrane Library which is updated quarterly on CD-ROM[8].

EPOC is a review group which aims to undertake systematic reviews of behavioural/professional, educational, organizational, financial and regulatory interventions to improve professional practice and the delivery of effective health services[10]. The underlying rationale for the work of the group is that systematic reviews of such strategies will provide the best evidence about their effectiveness.

The editors of EPOC undertook an overview of systematic reviews of interventions to improve practice published between 1966 and August 1995[11]. We identified 18 systematic reviews covering: specific interventions (for example, audit and feedback, computerized decision support); specific target groups (for example, nurses); and specific activities (for example, smoking cessation). The overview concluded 'it is striking how little is currently known about the effectiveness and cost-effectiveness of interventions aiming to achieve changes in practice or the delivery of health care'. However, passive dissemination of information appeared to be ineffective and 'more intensive efforts to alter practice' appeared necessary.

Recognizing the methodological difficulties inherent in such reviews, EPOC developed a standardized methodology including a taxonomy of interventions, quality criteria for randomized controlled trials and quasi-experimental studies, and a check list for data extraction. There are currently approximately 50 collaborators worldwide actively involved in EPOC reviews which are published in the Cochrane Library[12]. There are nine reviews and 16 protocols in the most recent update of the Library[8] (Box 1). The following section briefly summarizes the findings of the completed EPOC reviews and discusses their relevance to the UK setting.

Systematic review of the dissemination of educational materials

Freemantle and colleagues[13] undertook a review of the effectiveness of disseminating written educational materials by publication in professional journals or mail to targeted clinicians. They identified nine studies which compared educational materials and a non-intervention control.

Box 1 **Current reviews and protocols in the Cochrane Effective Practice and Organization of Care Module (Ref 8)**

Reviews

- Audit and feedback to improve healthcare professional practice and healthcare outcomes (Parts I and 2)
- Expanding pharmacists' roles and health services utilization, costs, and patient outcomes
- Hospital-at-home compared to in-patient hospital care
- Interventions to assist patients to follow prescriptions for medications
- Interventions to change collaboration between nurses and doctors
- Local opinion leaders to improve health professional practice and healthcare outcomes
- Outreach visits to improve healthcare professional practice and healthcare outcomes
- Printed educational materials to improve the behaviour of healthcare professionals and patient outcomes

Protocols

- Computerized advice on drug dosage to improve prescribing practice
- Discharge planning from hospital to home
- Educational meetings, workshops and preceptorships to improve the practice of health professionals and healthcare outcomes
- Guidelines in professions allied to medicine
- Impact of capitation, salaried, fee for service and mixed (two or three of the former methods) systems of payment on the behaviour of PCPs
- Impact of mass media campaigns on health services utilization and healthcare outcomes
- Improving health professionals' management of obesity
- Interventions aimed at influencing the use of diagnostic tests
- Interventions for implementing prevention in primary care
- Interventions to improve immunization rates
- Institutional versus at-home long-term care for disabled elderly
- Nursing record systems, nursing practice and patient care
- Reminders: on-screen computer reminders. Their effectiveness in improving healthcare professional practice and patient outcomes
- The impact of telemedicine as an alternative to face-to-face patient care, on professional practice and patient care
- The effect of on-site mental health workers on primary care providers' clinical behaviour
- The effect of target payment on primary care professional (PCP) behaviour

Across these studies none of the 19 estimates of provider behaviour and nine estimates of patient outcome were statistically significant ($P<0.05$ or less). The authors concluded that 'the effects of printed educational materials compared to no intervention are at best small . . . and of uncertain clinical significance'.

Despite the lack of evidence of their effectiveness in improving practice, distribution of printed educational materials remain one of the most widely used dissemination strategies in the UK. Local policy makers and professionals should consider whether the costs are likely to be worth the benefits. It seems unlikely that it is worth developing and passively disseminating educational materials without further active dissemination and implementation strategies.

Systematic review of audit and feedback

Thomson and colleagues[14] conducted a review of the effectiveness of audit and feedback which was defined as any summary of clinical performance of healthcare over a specified period of time. Thirty-seven studies across a wide range of clinical behaviours were identified, with 28 studies measuring physician performance, one study targeting patient outcomes only in diabetes and the remaining eight studies attempting to improve both types of outcomes. Thirteen trials compared audit and feedback to a no intervention control group, eight of which reported statistically significant changes in favour of the experimental group in at least one major outcome measure. However, the quality of many studies could not be determined from the published report and the clinical importance of the changes was not always clear. The authors concluded that 'audit and feedback can sometimes be effective in improving the practice of health care professionals. When it is effective, the effects appear to be small to moderate but potentially worthwhile. Those attempting to enhance professional behaviour should not rely solely on this approach'.

Within the UK, significant resources have been devoted to clinical audit with little evidence about its effectiveness. Furthermore, many audit activities within the UK would not fulfil the inclusion criteria of the review. A study of audit activities at the primary–secondary care interface observed that most projects floundered at the stage of introducing behaviour change[15]. Further research is required to determine factors associated with the effectiveness of audit and feedback and its cost-effectiveness relative to other implementation strategies.

Systematic review of educational outreach

Thomson *et al.*[16] reviewed the effectiveness of educational outreach visits defined as the 'use of a trained person who meets with providers in their practice settings to provide information with the intent of changing the provider's performance'. The authors located 18 studies meeting the inclusion criteria. The methodological quality of the included trials was not consistently reported. There were significant effects in favour of the experimental group in 10 of 12 trials aimed at improving prescribing when outreach visits alone or in combination with interventions such as social marketing were compared with a no intervention control group. The authors concluded that 'educational outreach visits, particularly when combined with social marketing appear to be a promising approach to modify professional behaviour, especially prescribing. Further research is needed to assess the effectiveness of outreach visits for other aspects of practice and to identify key characteristics of outreach visits that are important to its success. The cost-effectiveness of outreach visits is not well evaluated'.

In this review, only two of the 18 trials took place in the UK and in these studies the interventions did not include social marketing strategies that were used in several of the North American prescribing studies. Whilst this intervention is potentially promising, further research is required in UK settings to establish its cost-effectiveness relative to other implementation strategies for prescribing and other types of behaviour.

Systematic review of opinion leaders

Thomson and colleagues[17] undertook a review of the effectiveness of recruiting opinion leaders to promote the uptake of research findings. For the purposes of the review, opinion leaders were defined as healthcare professionals nominated by their colleagues as 'educationally influential'. They identified six studies targeting different behaviours, all of which observed some improvement in at least one aspect of provider behaviour. However, in several studies the methods of the trials were poorly reported and the results of the two methodologically most robust studies which used similar methods were contradictory. The study by Lomas and colleagues[18] observed that opinion leaders improved the rate of vaginal birth after previous Caesarean section in Canadian community hospitals, whereas that by Hodnett and colleagues[19] observed no significant effect of opinion leaders on intrapartum care. The authors of the review concluded that the 'use of local opinion leaders results in mixed effects on professional practice. However, it is not clear what local opinion leaders do and replicable descriptions are needed. Further research is required to determine if opinion leaders can be identified and in which circumstances they are likely to influence the practice of their peers'.

There is currently considerable interest in the role of opinion leaders to promote implementation of research findings. However, there is relatively little evidence to support the widespread use of this intervention and the key components which contribute to the success of this intervention remain unclear. Furthermore, none of the trials identified in the review were conducted in UK settings. Policy makers should be cautious about using this strategy until the feasibility of this intervention is established for different professional groups and settings, the components of the intervention which influence the effectiveness of the intervention are better understood and the cost-effectiveness of this approach relative to other implementation strategies within the UK is established.

Systematic review of the expanded role of pharmacists

Bero and colleagues[20] completed a review of the impact of the expanded role of community and outpatient pharmacists. Fourteen studies which evaluated services delivered by pharmacists directly to patients or to other health professionals were included. When pharmacist services were targeted at patients, there were statistically significant reductions in non-scheduled health services and improvement in patient outcomes compared to no intervention. When interventions were directed to physicians, prescribing costs were significantly reduced compared to no intervention but effects on patient outcomes could not be determined. The authors concluded 'the limited numbers of studies analysed support the expanded roles of pharmacists in patient counselling and physician education. However, doubts about the generalizability of the studies, the poorly defined nature of the interventions tested, and the lack of studies including cost assessments and patient outcome data indicate that more rigorous research is needed to document the effects of outpatient pharmacist interventions'. Organizational interventions have the potential to improve quality of care and should be considered when there are barriers to improvement at the organizational level in health care institutions. However, these have been poorly evaluated and further research of such interventions is required.

Systematic review of interventions to improve doctor–nurse collaboration

Zwarenstein and colleagues[21] undertook a review of interventions to improve collaboration between doctors and nurses. Despite intensive searching, the authors were unable to identify any relevant studies with sufficiently rigorous designs. They concluded 'Before initiating new programs or stopping existing programs to improve nurse–doctor collaboration, those responsible should consider evaluating the effects of any proposed changes' and 'Research should be initiated to examine the effectiveness of interventions to improve collaboration'. Despite the importance of collaboration in health care settings, it is surprising that few rigorous evaluations have been done.

DISCUSSION

Healthcare professionals have a responsibility to keep up-to-date with research findings to ensure that their practice is effective[22]. However, most professionals have only limited time to devote to educational activities. It is therefore important that professionals identify effective and efficient strategies for keeping up-to-date. Traditional methods such as distribution of printed educational materials and didactic educational meetings may not be very effective in changing behaviour. Systematic reviews of interventions to improve professional practice can assist healthcare providers in choosing appropriate professional development/continuing education activities. Increasingly, professionals are encouraged to use secondary knowledge sources such as guidelines and systematic reviews and to develop critical appraisal skills. There is considerable evidence that guidelines are effective in changing behaviour if appropriately disseminated and implemented[23]. Professionals should participate in implementation programmes where possible. There is an ongoing EPOC systematic review of the effectiveness of critical appraisal training.

Many barriers to improvement operate at the organizational level and an organizational approach to dissemination and implementation may be needed to overcome these. To maximize the potential of implementation strategies, organizational culture needs to support clinical effectiveness and quality improvement (including priority setting and adequate resources)[6]. The choice of implementation strategy should be based upon consideration of the targeted activity and health professional group as well as the healthcare setting and available resources. Systematic reviews of dissemination and implementation strategies will provide useful evidence about the potential effectiveness of interventions and factors influencing their effectiveness. Quality assurance structures should use such evidence when planning implementation activities.

In contrast to the substantial resources devoted to biomedical research, relatively few resources have been devoted to implementation research. Given the paucity of evidence, it is vital that dissemination and implementation activities should be rigorously evaluated; healthcare professionals and organizations should participate in such studies wherever possible.

CONCLUSIONS

There are no simple solutions to implementing research findings. However, there are a variety of possible implementation strategies that are effective in specific circumstances. It is likely that combinations of interventions will be necessary rather than relying on single interventions. It remains unclear to what extent such strategies are currently used in the UK. Individual healthcare professionals should identify and participate in effective educational and implementation strategies. Healthcare organizations should attempt to plan changes based upon considerations of the effectiveness of dissemination and implementation strategies determined by randomized trials and systematic reviews. Given the relative lack of rigorous evidence, healthcare professionals and organizations should participate in rigorous evaluations of different strategies wherever possible.

Acknowledgments We would like to acknowledge the work of the authors of the reviews summarized. The Cochrane Effective Practice and Organization of Care Groups is funded by Anglia & Oxford Regional Health Authority, Chief Scientist Office of the Scottish Office Home and Health Department, NHS Welsh Office of Research and Development, Northern Ireland Department of Health and Social Services, North Thames Regional Health Authority, North West Regional Health Authority, South & West Regional Health Authority, South Thames Regional Health Authority, Trent Regional Health Authority, Northern and Yorkshire Regional Health Authority, West Midlands Regional Health Authority in the United Kingdom, and by the Norwegian Research Council and Ministry of Health and Social Affairs in Norway. The Health Services Research Unit is funded by the Chief Scientist Office of the Scottish Office Home and Health Department. However, the views expressed are those of the authors and not necessarily the funding bodies.

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